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Measuring Human Capital**A Norwegian satellite account for education and training****Trial calculations****Prepared by Statistics Norway¹***Summary*

This paper presents the setup of a Norwegian satellite account for education and training, based on the recommendations in the Guide on measuring Human Capital. So far only expenditure spent on formal and non-formal education are taken into account as they are readily available in the national accounts. The Norwegian country case includes detailed information on financial transactions, thus distinguishing between who is producing and who is financing the total expenditure on education services. The expenditure data is linked to other indicators on human capital. Supplementary tables, e.g. employment broken down by educational attainment and industry are included. In this respect, it can be noted that labour is the most important factor of production, which means that such analysis is crucial for the enhanced study of multifactor productivity.

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I. Introduction and motivation

1. In the draft version of the Guide on Measuring Human Capital it is said that *“Understanding human capital is of significant interest to policymakers. Statistics on human capital may help to understand the drivers of economic growth and the functioning of the labour market”*, (draft Guide paragraph 1).

2. The Guide discusses the concept of human capital, methodological and implementation issues, and challenges related to its valuation. It provides recommendations aimed at producing estimates that are as consistent as possible with national accounting concepts and comparable across economies. The Guide also proposes the set up of two satellite accounts, a Satellite Account on Education and Training and an extended Human Capital Satellite Account.

3. Because of both data constraints and methodological issues, the Guide suggests, to first start developing a satellite account for education and training (SAE). This is a narrow approach to human capital accounting, namely to supplement the SNA core system by using data that are already largely available in the core accounts of SNA. This account extends the production boundary of the SNA only slightly by recognizing own account production of training. The idea is to provide policy makers with more detailed data on the expenditures on education, and the financing of these expenditures.

4. To put it in another way, having access to the value of output by type of education product allows the identification: i) how education/training is used in the national economy; ii) the relative importance of the actual financing agents and education producers; iii) the proportion of education and training financed by individuals, enterprises and government; iv) at what ISCED levels major resources are allocated; v) the relationships with the rest of the world and, possibly, the balance of the benefits for students or domestic producers in the country of origin or abroad.

5. Another issue, which can be mentioned is that starting with evaluating the expenditure costs, can be one step forward in valuing the “asset” human capital. The draft guide, paragraph 127, states: *“Empirical estimates of physical capital stock are often derived by valuing assets at the cost of their production and aggregating vintages of the type of asset at a point in time, correcting for retirement of old assets and their decline in value (depreciation). This approach is called the Perpetual Inventory Method (PIM) and is explained further in the OECD manual (2009). The cost-based approach values the human capital stock as being the depreciated value of the amount invested in human capital adjusted to current prices. The method is popular because of the general availability of expenditure data on capital goods, and it is still a standard accounting practice in much financial and management reporting. In addition, the cost-based approach is in line with much of the valuation of economic capital in the 2008 SNA. When extending the capital concept to knowledge and skills the cost-based method is an obvious choice in valuing human capital”*.

6. Based on the recommendations from the Guide, Statistic Norway has tested the setup of a Satellite account for education and training. So far we have only taken into account expenditure spent on formal and non-formal education as they can be found in the national accounts. No estimates have been made on in-house training, which, as already mentioned, would have been a modest extension of the production boundaries in the SNA. The latter is put on our agenda for future research. It should be noted that the impact of own account production of training in the enterprises, probably is of minor significance to the overall expenditure on education.

7. To broaden the analysis beyond the monetary data, we have included supplementary tables showing the numbers of students by education level and the number of employees broken down by education and industry. In this trial exercise, we show data for two years, 2010 and 2013. The monetary data can, however, rather easily be extended backwards to 1970. Longer time series will be most relevant for analysing volume growth and for analysing shift in prioritisation of where expenditure on education is spent.

II. Towards a satellite account for education and training

A. What is included?

1. Current expenditure

8. As already said, we have looked at all current expenditure on education as they can be found in the National accounts, regardless if the producer is government, a non-profit organisation or a market producer. Both formal and non-formal education, as adult courses, special courses for refugees, music schools for children, driving schools etc, are included. The monetary data have been classified according to the International Standard Classification of Education (ISCED 2011). An important tool in this work has been the link between ISCED and The Classification of individual consumption according to purpose (COICOP), Classification of the function of government (COFOG) and Classification of the purposes of non-profit institutions serving households (NPISHs), as given in table 5.1 of the Guide. The expenses on non-formal education are classified under non-ISCEC education.

9. We have also organised the expenditure data broken down by ISCED by financing agents. In Norway, formal education is mainly government financed, even though it might be provided by private or non-profit organisations. Central government finances mainly higher education, while local government is responsible for primary and secondary-education. Private schools exist both for primary and secondary-education, but according to the law, 85 per cent of the school's "normal" operating cost is subject to government financing (central government). The rest will be paid by the students.

10. Enterprises can also pay for education services, i.e. employees' participating in different courses. Such expenses will be recorded as intermediate consumption in the national accounts. Since supply and use accounts are integrated in the Norwegian national accounts, we can follow the supply and the use of the different education services, allowing us to estimate education expenditures financed by financial and non-financial corporations. Indirect costs related to in-house training is so far not implemented, as more research is needed.

11. In addition to expenditure on education services, ancillary expenditures, i.e. on public school transport is included. Such expenditures are allocated to a relevant ISCED group. Household final consumption expenditure on textbooks and school utensils are included. It is only for higher education that this is relevant, else textbooks and utensils are for free. Presently, we have no good data sources for estimating the household's out of pocket payments on textbooks etc. Thus, for this test calculation, we decided to include a conventionally set share of the expenditures we find on relevant COICOP groups. Investigation into finding more proper shares will be done in the future.

2. Gross fixed capital formation

12. In the Guide it is stated that "*expenditures on gross fixed capital formation in the education system play a crucial role in the provision of education services by maintaining*

or expanding production capacity. However this must be clearly distinguished from the current expenditures on education, and one should be careful not to add up the two types of expenses. It should also be noted that consumption of fixed capital in education is already included in the current production costs. It is however, of interest to show expenditures on investment in the education industry in the tables, and the Guide recommends that this is included”, (paragraph 404).

13. In this paper we clearly distinguish between current and capital expenses, but have included also the gross fixed capital formation in table 1. Gross fixed capital formation includes expenditure on research and development (R&D) in education and expenses on grossed fixed capital formation other than R&D.

3. Employment and education

14. From the labour accounts integrated in the Norwegian national accounts, we are able to give the breakdown of number of employees by industry and education group. The data can also be grouped by gender.

15. One important issue with this table is to follow the industries’ demand for various types of labour input. Staff with higher education, to which branches are they recruited? Does the education level in the industries changes over time? Answers to this can for example enhance analysis of (future) mismatches in demand and supply of labour. Another issue will be to have a better basis for studying multifactor productivity.

4. Other supplementary data

16. Expenditures spent on education are compared with statistical data for education like number of pupils/students. This allows us to analyse the average cost spent on students in different education settings.

III. What have we found?

17. According to data from the national accounts, the production of education contributed 3.3 per cent to the total domestic production in 2013, while the contribution to GDP was 4.3 per cent. However, the number of employees in education made 7.4 per cent of the total. Of these employees more than 75 per cent had higher education.

A. Expenditure on education by type of education

18. According to table 1, the total expenditure on education amounts to 5 per cent of gross domestic product (GDP) in Norway. The average annual volume growth in the period 2010-2013 has been 1.4 per cent.

Table 1: Education expenditure. Key figures. NOK million.

	2010	2013	Average annual volume growth
Expenditure on education *	132 480	152 457	
Expenditure on education. Constant 2010 prices *	132 480	137 954	1.4
Gross fixed capital formation in education institutions.....	27 885	30 538	
Expenditure on education. Per cent of GDP *	5.1	5.0	

* Gross fixed capital formation is not included.

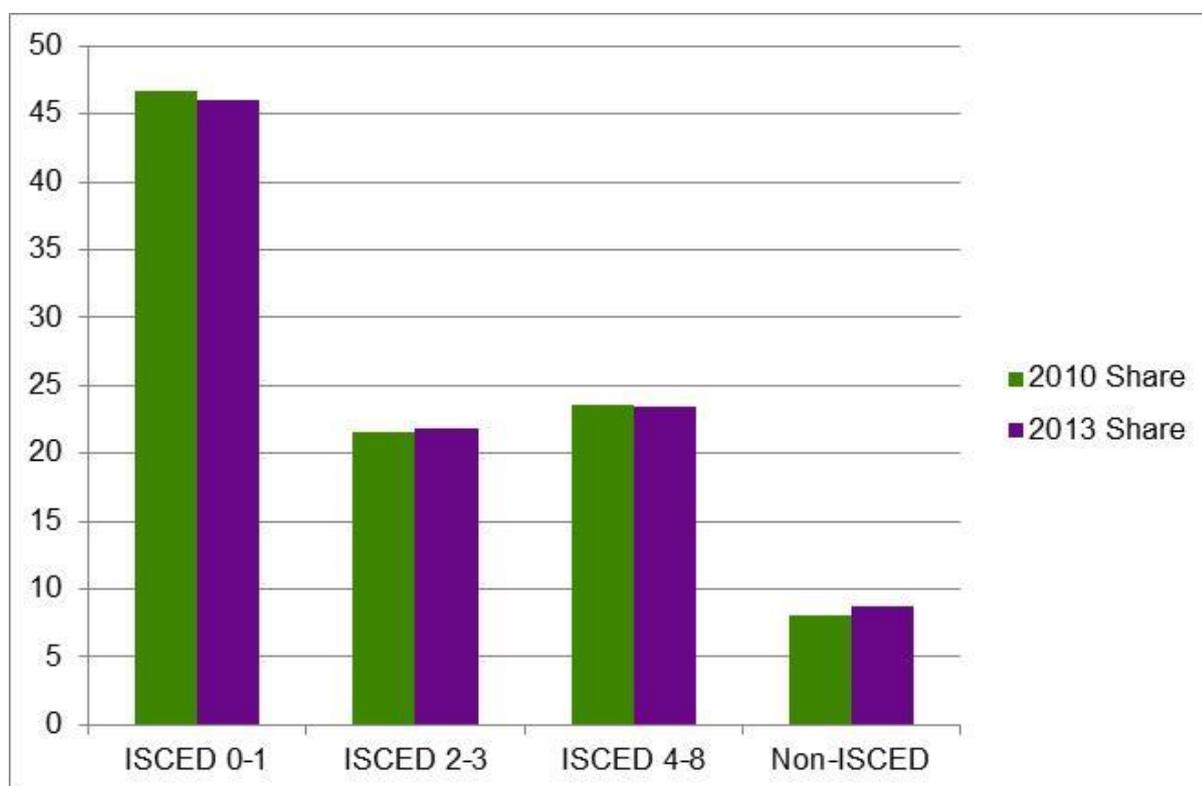
19. In table 2 we have broken down the expenditure on education by education level. The table show that more than 46 per cent of the total expenditure is related to primary education, nearly 22 per cent on secondary education and 23 per cent on higher education. About 8 per cent is spent on non-formal education. The shares are also illustrated in figure 1, and we see that the shares have been stable for the two years that we have compared.

Table 2: Education expenditure, by education level. Current prices.

	2010	2013	2010	2013
	NOK million	NOK million	Share	Share
ISCED 0-1 (pre-primary/primary education).....	61 955	70 107	46.8	46.0
ISCED 2-3 (secondary education).....	28 605	33 352	21.6	21.9
ISCED 4-8 (higher education).....	31 235	35 672	23.6	23.4
Non-ISCED education.....	10 685	13 326	8.1	8.7
Total expenditure on education.....	132 480	152 457	100.0	100.0

Figure 1

Expenditure on education levels as share of the total expenditure. Per cent.



20. Table 3 shows the number of pupils/students in the three ISCED groups and the average cost per pupil/student. The average expenditure per student in secondary education was 46 per cent higher than the expenditure per pupil in primary school in 2013, more or less as three years earlier. The table also show that the average expenditure per student in higher education was 15 per cent lower than in secondary education in 2013 while only 8 per cent lower in 2010. So far we have had no time to investigate in the quality of these results, something that needs to be done in the future. We feel comfortable with the total expenditure on education, but there realise that there can be challenges in distributing the costs to the correct ISCED groups.

Table 3: Expenditure on education per pupil/student.

	2010 NOK	2013 NOK	Average annual volume growth
Expenditure on ISCED 0-1 per pupil.....	100 581	113 934	0.4
Expenditure on ISCED 2-3 per pupil.....	148 303	166 714	0.9
Expenditure on ISCED 4-8 per student.....	137 146	140 821	-1.7
Pupils at level ISCED 0-1.....	615 973	615 327	
Pupils at level ISCED 2-3.....	192 883	200 056	
Students at level ISCED 4-8.....	227 747	253 317	

B. Expenditure on education by source of funding

21. In table 4 we find the total expenditure broken down by financing agent. General government finances more than 90 per cent of total expenditure, while the households' out of pocket payments contribute with only 8 per cent. Corporations finance just a very small part of the expenditures on education. This must, however, also be seen in connection with the fact that so far no in-house training is implemented.

Table 4: Education expenditure, by source of funding. Current prices.

	2010 NOK million	2013 NOK million	2010 Share	2013 Share
General government.....	122 069	139 721	92.1	91.6
- Central government.....	32 931	37 992	24.9	24.9
- Local government.....	89 138	101 729	67.3	66.7
Corporations.....	396	497	0.3	0.3
Private households.....	10 015	12 239	7.6	8.0
Rest of the world.....	0	0	0.0	0.0
Total expenditure on education.....	132 480	152 457	100.0	100.0

22. Table 5 classifies the financing agents according to ISCED groups for the year 2013. Primary and secondary education is mainly financed by the local government, estimated to respectively 94 and 88 per cent. Central government is the main financer of higher education, contributing to 85 per cent per cent of the expenditures in 2013, while the households contribute with about 15 per cent.

23. Table 5 also shows that 42 per cent of the households out of pocket payments on education relates to non ISCED education. A similar share is spent on higher education.

24. For Non-ISCED education, or informal education, the central and local government contribute with about 57 per cent each of the expenditure, while the households contribute with nearly 39 per cent and corporations with about 4 per cent. The relatively high contribution from local government is related for example to music school for children, which is organised and partly financed by the municipalities. The municipalities will also finance different courses for refugees and others applying for asylum, integrating them in the Norwegian society.

Table 5: Education expenditure, by source of funding and education level. Current prices. Year 2013.

Part 1: NOK million	Central government	Local government	Corporations	Private households	Total
ISCED 0-1.....	3 953	65 847	0	307	70 107
ISCED 2-3.....	2 842	29 217	0	1 293	33 352
ISCED 4-8.....	30 229	0	0	5 443	35 672
Non-ISCED education.....	968	6 665	497	5 196	13 326
Total expenditure.....	37 992	101 729	497	12 239	152 457

Part 1: Share	Central government	Local government	Corporations	Private households	Total
ISCED 0-1.....	5.6	93.9	0.0	0.4	100.0
ISCED 2-3.....	8.5	87.6	0.0	3.9	100.0
ISCED 4-8.....	84.7	0.0	0.0	15.3	100.0
Non-ISCED education.....	7.3	50.0	3.7	39.0	100.0
Total expenditure.....	24.9	66.7	0.3	8.0	100.0

C. Employees by education

25. Table 6 shows the number of employees by industry and cross-classified with educational level, while table 7 shows the shares. It can be noted that the industries with the highest educational level are information and communication, financial and insurance activities, real estate, professional, scientific and technical activities, public administration in addition to education. In all these activities more than 50 per cent of the staff has higher education. The table shows that from 2010 to 2013, the share of employees with higher education has increased in all industries. Lowest education levels can be found in agriculture and fishing, electricity and water supply and accommodation and food service activities.

Table 6: Employed persons. Unit: 1000 persons.

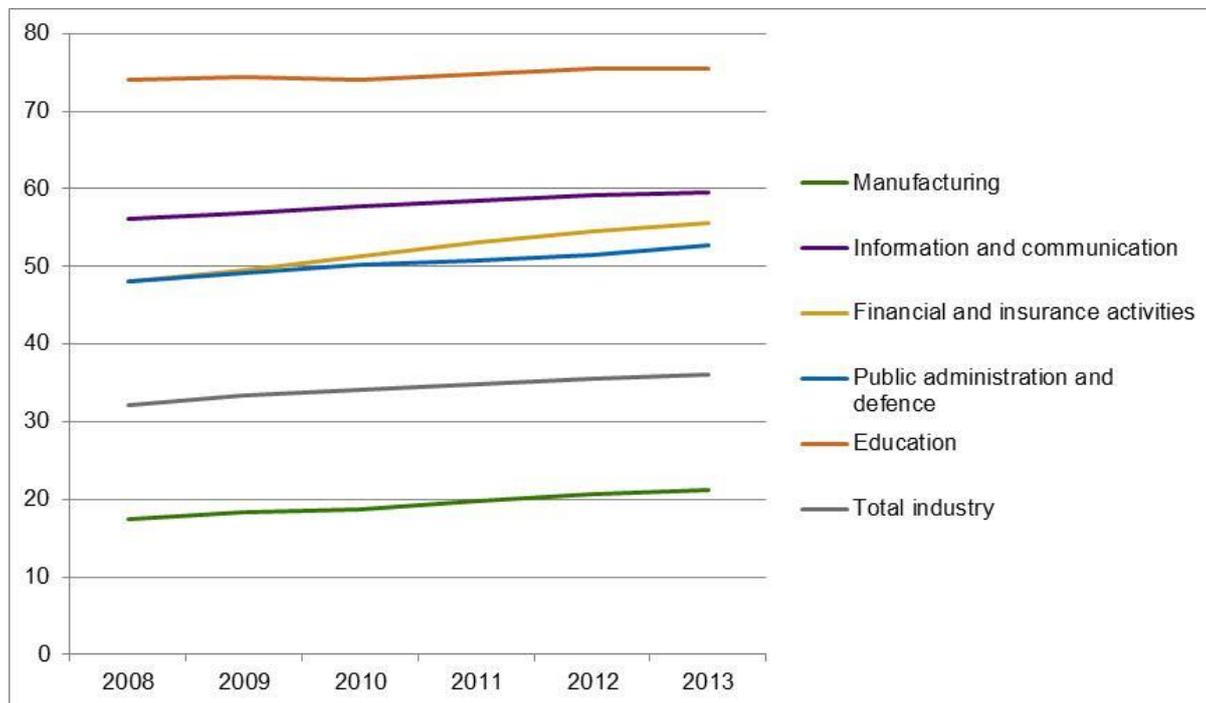
Industries	2010					2013				
	ISCED 0-1	ISCED 2-3	ISCED 4-8	Unknown	Total	ISCED 0-1	ISCED 2-3	ISCED 4-8	Unknown	Total
Agriculture, forestry and fishing.....	23	38	8	2	70	21	36	9	3	69
Mining and quarrying.....	6	28	23	1	58	6	33	29	2	69
Manufacturing.....	58	136	46	7	247	54	133	53	11	251
Power and water-supply, sew/remed.activities.....	5	14	7	0	27	5	14	8	1	27
Construction.....	47	115	17	8	187	50	126	20	15	211
Wholesale and retail trade, repair of motor vehicles..	115	191	56	7	369	111	188	62	9	370
Transport and storage.....	49	92	27	4	172	48	91	30	6	174
Accommodation and food service activities.....	29	32	11	7	80	29	33	14	11	86
Information and communication.....	8	27	49	1	86	8	26	53	2	89
Financial and insurance activities.....	3	22	26	0	52	3	19	28	0	50
Real estate, profess., scient. and technical activities..	12	44	80	3	139	12	44	88	4	148
Administrative and support service activities.....	30	48	26	9	113	31	51	30	14	127
Public administration and defence.....	21	71	93	1	186	20	69	102	1	193
Education.....	12	34	143	3	193	12	34	151	3	200
Health and social work.....	84	195	235	6	520	83	200	265	6	554
Arts, entertainment and other service activities.....	18	39	35	2	93	17	39	36	3	94
Total industry.....	519	1127	885	61	2591	511	1135	976	91	2713
General government.....	92	259	413	7	771	91	260	451	8	809
- Central government.....	19	78	184	3	284	19	77	198	3	297
- Local government.....	73	181	229	4	487	72	184	252	5	513

Table 7: Employed persons. Share.

Industries	2010					2013				
	ISCED 0-1	ISCED 2-3	ISCED 4-8	Unknown	Total	ISCED 0-1	ISCED 2-3	ISCED 4-8	Unknown	Total
Agriculture, forestry and fishing.....	32	54	11	3	100	31	52	13	4	100
Mining and quarrying.....	11	48	39	2	100	9	47	42	2	100
Manufacturing.....	23	55	19	3	100	21	53	21	4	100
Power and water-supply, sew/remed.activities.....	20	52	26	1	100	19	51	28	2	100
Construction.....	25	62	9	4	100	24	59	10	7	100
Wholesale and retail trade, repair of motor vehicles..	31	52	15	2	100	30	51	17	3	100
Transport and storage.....	28	53	16	2	100	28	52	17	3	100
Accommodation and food service activities.....	36	40	14	9	100	34	38	16	13	100
Information and communication.....	9	32	58	2	100	9	30	60	2	100
Financial and insurance activities.....	6	42	51	1	100	6	38	55	1	100
Real estate, profess., scient. and technical activities..	9	32	58	2	100	8	30	59	3	100
Administrative and support service activities.....	26	43	23	8	100	25	40	24	11	100
Public administration and defence.....	11	38	50	1	100	11	36	53	1	100
Education.....	6	18	74	2	100	6	17	76	1	100
Health and social work.....	16	38	45	1	100	15	36	48	1	100
Arts, entertainment and other service activities.....	19	42	37	2	100	18	41	38	3	100
Total industry.....	20	43	34	2	100	19	42	36	3	100
General government.....	12	34	54	1	100	11	32	56	1	100
- Central government.....	7	27	65	1	100	6	26	67	1	100
- Local government.....	15	37	47	1	100	14	36	49	1	100

26. In figure 2, we have illustrated the share of employees with higher education for some selected industries for the period 2008-2013. For instance for manufacturing, this share has gradually increased from 17 per cent in 2008 to 21 per cent in 2013. In financial and insurance activities 48 per cent of the employees had higher education in 2008, while the share had risen to 56 per cent in 2013.

Figure 2

Employed persons with higher education by industry. Per cent.

27. The employment data can be examined more closely, and are also useful in analysis of productivity.

IV. Concluding remarks

28. Our tests have shown that combining available data from the national accounts, in a rather efficient way can give information for the proposed satellite account for education and training. So far we have not implemented in-house production of training. More research and work related to the quality of the data is also needed before the final satellite accounts can be set up. Exchange of experience with other countries testing satellite accounts for education and training would be much welcomed.

29. In addition we think it is important that international organizations take on board the new satellite account and start publishing international comparable data. Without the international demand for the data, the fear is that the proposal of implementing satellite account on education and training will be given rather low priority in the statistical offices, competing with a lot of other initiatives.

References

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